

# Can nicotine use alleviate symptoms of psoriasis?

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**P**soriasis is a common chronic skin disorder with an estimated prevalence in the United States of 2.5% in white individuals and 1.3% in African Americans.<sup>1</sup> Although psoriasis can manifest at any age, there seem to be 2 peaks in onset: one between the ages of 20 and 30 years, and another between the ages of 50 and 60 years.<sup>2</sup> Several clinical types of psoriasis have been described; however, 90% of cases present with plaque psoriasis.<sup>3</sup> Previously, psoriasis was regarded as a disease of hyperproliferation but more recently it has been regarded as an immune-mediated disease.<sup>4</sup> The clinical features of psoriasis include symmetrically distributed plaques involving the scalp and extensor surfaces of the elbows, knees, and back. The plaques are erythematous with a thick, silvery scale, and sharply defined margins that are raised above the surrounding normal skin (**Figure 1**). Histology of the lesions demonstrates the 5 main features of psoriasis: 1) hyperkeratosis and parakeratosis; 2) neutrophils in the epidermis; 3) thinning of the epidermis overlying the dermal papillae; 4) vessels close to the epidermis; and 5) elongated rete ridges (**Figure 2**).

There exists much evidence that cigarette smoking is a risk factor for both the development and the exacerbation of psoriasis.<sup>5,6</sup> However, in light of the newer evidence supporting the idea that psoriasis is an immune-mediated disease,<sup>7,8</sup> it is instructive to consider other ways in which smoking could affect patients with psoriasis. In the following case, cigarette smoking and nicotine replacement therapy appeared to have a therapeutic effect on the patient's psoriasis. This is the first such case described in the literature.

## Case

A 61-year-old male ex-smoker with a history of psoriasis, gastroesophageal reflux disease, and sleep apnea presented with a request to renew his prescription for nicotine replacement therapy. On reviewing the patient's history it was revealed that the patient had quit smoking several years previously but still wanted nicotine replacement owing to the apparent relief of the symptoms of his psoriasis. In 1993 at age 54, after 30 pack-years of smoking, the patient succeeded in quitting with the assistance of nicotine patches. Later that year he developed characteristic psoriasis plaques on his knees and elbows. He tried topical steroids with minimal results and subsequently stopped the therapy. In the fall of that year the patient began smoking again, and after 3 months his psoriasis disappeared. In 2003, the patient quit smoking, again with the aid of nicotine patches (the regular 6- to 8-week program). In 2004, his psoriasis returned. In 2005, he started to smoke again, with the psoriasis disappearing a few months later. He subsequently quit again, and by 2007 he had been a non-smoker for 2 years, this time with the assistance of nicotine gum. He continued to chew the gum, and his psoriasis had not returned (**Figure 3**).

## Discussion

The concurrence between the patient's return to cigarette smoking and the remission of his psoriasis prompted an investigation to ascertain the

## EDITOR'S KEY POINTS

- Cigarette smoking has been established as a strong risk factor for the development and aggravation of psoriasis. There is anecdotal evidence that cigarette smoking and nicotine replacement therapy can resolve the symptoms of psoriasis. However, there are no previous cases or supportive research articles in the literature.
- Smoking cigarettes appears to be protective against ulcerative colitis, possibly owing to the anti-inflammatory effects of nicotine. Nicotine appears to block the release of pro-inflammatory mediators from Th17 cells, thus dampening the immune response and attenuating damage to the colon.
- Psoriasis was previously regarded as a disease of hyperproliferation. In light of recent data demonstrating that psoriasis is an immune-mediated disease, the possibility that novel anti-inflammatory treatments such as nicotine replacement therapy or analogues could have a beneficial effect on patients with psoriasis should be considered.

## POINTS DE REPÈRE DU RÉDACTEUR

- Il a été établi que le tabagisme était un facteur de risque important dans le développement et l'aggravation du psoriasis. Des preuves anecdotiques indiquent que fumer la cigarette et les thérapies de remplacement de la nicotine peuvent régler les symptômes du psoriasis. Toutefois, il n'existe pas d'analyses de cas antérieures ni d'articles de recherche à l'appui dans les ouvrages spécialisés.
- Fumer la cigarette semble avoir un effet protecteur contre la colite ulcéreuse, peut-être en raison des propriétés anti-inflammatoires de la nicotine. La nicotine semble bloquer la libération des médiateurs pro-inflammatoires des cellules Th17, atténuant ainsi la réaction immunitaire, ainsi que les dommages au côlon.
- On considérerait auparavant le psoriasis comme une maladie d'hyperprolifération. À la lumière des récentes données démontrant que le psoriasis est une maladie d'origine immunologique, la possibilité que de nouveaux traitements anti-inflammatoires, comme la thérapie de remplacement de la nicotine ou des traitements analogues, puissent avoir des effets bénéfiques sur les patients atteints de psoriasis devrait être envisagée.

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potential therapeutic link between tobacco use and psoriasis. A review of the medical literature for previous cases or other support of the link between smoking and psoriasis was undertaken. PubMed was searched using

the MeSH terms *psoriasis* and *smoking*, and 101 articles were identified. The abstracts and articles were read to determine their relevance to the case at hand. A large number of the identified articles discussed the role of

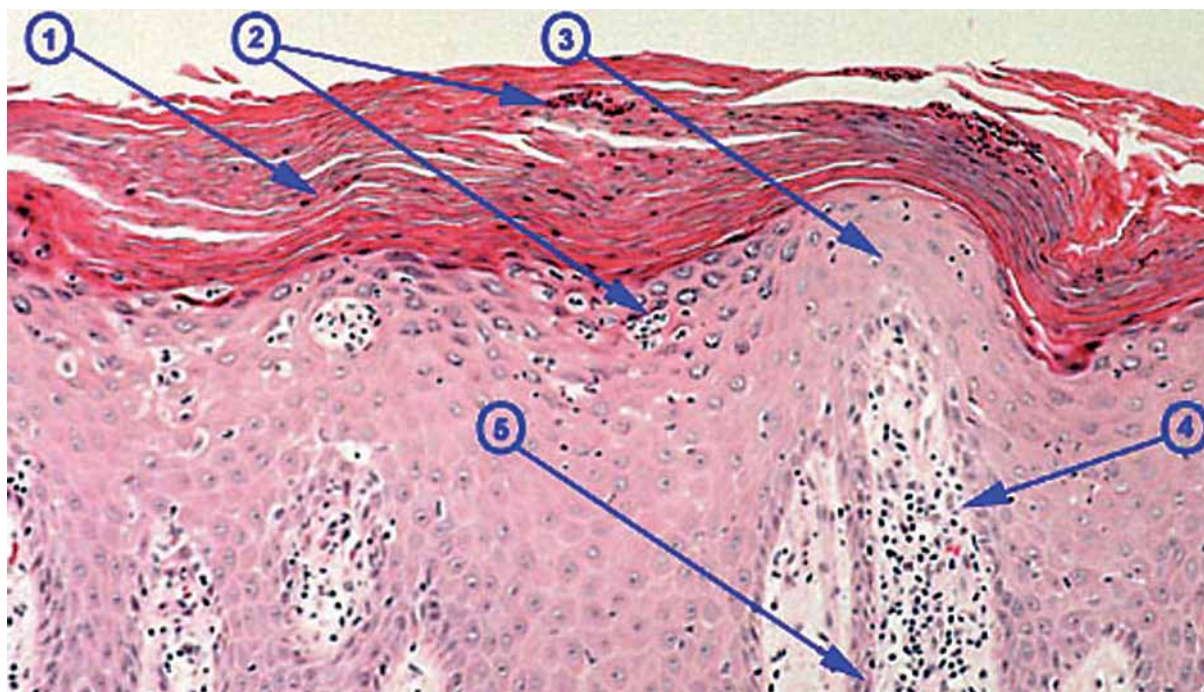
**Figure 1. Classic plaque psoriasis**



**Figure 3. Resolved psoriasis lesions on the knee**



**Figure 2. Histopathology of psoriasis:** 1) Hyperkeratosis and parakeratosis; 2) neutrophils in the epidermis; 3) thinning of the epidermis overlying the dermal papillae; 4) vessels close to the epidermis; and 5) elongated rete ridges.



smoking in the development of psoriasis and the worsening of patients' symptoms, but none of these articles gave evidence supporting a link between smoking and the resolution of psoriasis. The Cochrane Library was searched for articles with titles, abstracts, or key words containing *psoriasis* and *smoking*, but only 3 unrelated clinical trials were found. Another PubMed search was performed, this time using the MeSH terms *psoriasis* and *nicotine*, and 4 articles were returned. Again, none of these articles discussed the potential therapeutic use of nicotine in plaque psoriasis.

Despite the lack of previous cases or supportive research with regard to smoking and psoriasis, there are other diseases for which the therapeutic action of smoking, and of nicotine in particular, has already been established. Inflammatory bowel disease is one such illness.<sup>9</sup> There exists a distinctive relationship between inflammatory bowel disease and cigarette smoking. Smoking tends to worsen the condition of patients with Crohn disease, but it appears to be protective against ulcerative colitis.<sup>9</sup>

Currently, the beneficial effect of cigarette smoking in patients with ulcerative colitis is believed to be owing to anti-inflammatory effects of nicotine. Ulcerative colitis is thought to occur when immune cells located in the intestinal lamina propria are activated against normal intestinal flora in an unregulated manner.<sup>10</sup> These activated cells release pro-inflammatory mediators that both damage the intestinal mucosa and recruit more inflammatory cells to the area.<sup>10</sup> A PubMed search for *colitis, ulcerative/immunology* identified 342 review articles on this subject. Recent reviews discussed the role of a new subset of T-helper lymphocytes, the interleukin-17-secreting Th17 cells, in the pathogenesis of inflammatory bowel disease.<sup>11,12</sup> Nicotine appears to block the release of

pro-inflammatory mediators from these cells, thus dampening the immune response and attenuating damage to the colon.<sup>13</sup>

Comparing the immunologic processes occurring in psoriasis with those in ulcerative colitis reveals some important similarities. The same types of immune cells—Th17 cells in particular—and their mediators, found in the damaged colon in ulcerative colitis, are also found in the skin lesions of plaque psoriasis.<sup>7</sup> The presence of these cells and the pro-inflammatory cytokines they secrete, such as interleukin-17, provide a link between the damage caused in many cases of inflammatory bowel disease and psoriasis.<sup>7</sup> They might also help to explain why the patient noted an improvement in his psoriasis while he smoked cigarettes and used nicotine replacement therapy. Similar to the protective effect in ulcerative colitis, the nicotine the patient consumed might have had an immunosuppressive effect, inhibiting the release of pro-inflammatory mediators and the recruitment of immune cells, and might have resulted in the remission of his psoriasis.

## Conclusion

There exists a substantial body of evidence establishing cigarette smoking as a strong risk factor for the development and aggravation of psoriasis. However, in light of recent data demonstrating that psoriasis is an immune-mediated disease, the possibility that novel anti-inflammatory treatments such as nicotine replacement therapy or analogues could have a beneficial effect on patients with psoriasis should be considered. This case described one such occasion in which it appeared that nicotine had a therapeutic effect on a patient's psoriasis. Further research is required to determine whether this case is representative of a possible therapeutic link for which medicinal nicotine might be used in the treatment of psoriasis.



## Case Report

Mr Staples is a third-year medical student at the University of Alberta in Edmonton. Dr Klein is a family physician in Edmonton, and Associate Professor in the Department of Family Medicine at the University of Alberta.

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### Competing interests

None declared

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